REMARKS

Claims 1-6 are pending in this application. In this eighth and latest Office Action, the Office has rejected all claims under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 4,249,181 to Lee (hereinafter Lee) in view of U.S. Patent No. 6,052,582 to Blasing et al (hereinafter Blasing).

Summary of Prosecution History of Present Application

The combination of Lee and Blasing is the seventh prior art ground of rejection asserted by the Office in the prosecution of the present case. Applicant has traversed and overcome the six previous prior art rejections and respectfully traverses this rejection also.

More specifically, in the first Office Action in this case, then pending claims 1-3 were rejected over Davidson (U.S. Patent No. 5,949,769) in view of Yamasa (U.S. Patent No. 6,047,177). Applicant overcame that rejection.

In the second Office Action, the Office rejected claims 1-3 as anticipated by U.S. Patent No. 5,771,449 (hereinafter Blasing '449). The Office withdrew the rejection based on Blasing '449 in view of Applicant's arguments. Also in the response to that second Office Action, Applicant added new claims 4-6, which are method claims that are similar to apparatus claims 1-3 and which distinguish over Blasing for at least all of the same reasons as claims 1-3.

In the third and fourth Office Actions in this case, the Office rejected claims 1-6 based on a third set of prior art. Specifically, the Office rejected the claims as obvious over Blasing '449 in view of Langston.

However, the Office subsequently also withdrew the obviousness rejection based on Blasing '449 in view of Langston contained the third and fourth Office Actions in view of Applicant's arguments.

In the fifth Office Action in this case, the Office rejected claims 1-6 as anticipated under 35 U.S.C. 102(e) by a fourth new prior art reference, namely, U.S. Patent No. 6,473,616 to Sydor.

In response, Applicant pointed out, *inter alia*, that Sydor was not prior art under 35 U.S.C. 102(e) because the present application has an earlier effective filing date than Sydor. The Office subsequently withdrew the rejection based on Sydor.

In the sixth Office Action, the Office again rejected claims 1-6, this time under 35 U.S.C. 102(a), in view of a fifth new reference, namely, an alleged Canadian published patent application corresponding to Sydor. However, the Office neither provided nor cited that alleged Canadian patent publication. Furthermore, it turns out that the Office was relying on the filing date of Sydor's Canadian counterpart patent application, which, of course, does not constitute prior art under any section of the patent statute. The Office subsequently also withdrew the rejection based on Sydor's alleged Canadian counterpart.

In the seventh Office Action, the Office rejected claims 1-6 as anticipated by Blasing, which, at first blush, appeared to be a new prior art reference, but is actually identical to the Blasing '449 reference that was asserted in the second Office Action. Applicant pointed this out and the Office has now withdrawn that rejection.

Now, in this eighth Office Action, the Office rejected claims 1-6 as obvious over the newly cited reference Lee in view of Blasing.

The Present Invention

The present invention relates to an LMDS antenna array having multiple radiating antenna elements wherein the antenna elements are adjusted in phase and amplitude to achieve certain novel radiation patterns. Particularly, claim 1 includes the limitations that the antenna elements are adjusted in phase and amplitude (1) to mitigate radiation above the horizon and (2) to decrease attenuation in radiating power with distance from the antenna. Claim 2 depends from claim 1 and further adds that the antenna elements are adjusted in phase and amplitude to mitigate nulls between lobes of combined radiated signals. Finally, claim 3 depends from claim 1 and adds that the antenna elements are adjusted in phase and amplitude to reduce excess signal power at near range.

The Rejection

Regarding claim 1, the Office asserted that:

> Lee discloses a system "having comprising an antenna for transmitting a signal of reused frequency within a specified range from the antenna, the antenna having multiple radiating antenna elements provided with the signal, the signal provided to each of the antenna elements being adjusted in phase and in amplitude across the radiating elements to mitigate radiation above horizon, and the signal provided to each of the antenna elements being adjusted in phase and in amplitude to decrease attenuation in radiated power with distance from the antenna" (Figs 2-3 & col. 4/line 44 to col. 5/line 42 for a technique for tilting the antenna and antenna phased arrays are adjusted in amplitude and phase in gain can be increased or decreased to mitigate radiation above the horizon). However, Lee does not disclose that this technique is for use in a LMDS system; however, Lee suggests that to use in point-two-point radio transmission system (col. 1/lines 23-63). In addition, Blasing teaches a LMDS system having similar technique in providing antenna transmission patterns. [Citations omitted.] Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lee's antenna tilting technique in applying to Blasing's LMDS system for achieving the LMDS system with the antenna elements being adjusted in phase and amplitude to decrease the attenuation in radiated power with distance from the antenna as desired.

Lee discloses a tilted directional antenna for a cellular telephone system in which tilting can be achieved either mechanically or electrically (col. 4, lines 44-48). With respect to electrical tilting, Lee discloses "the dipoles are connected to be driven in different phases for effecting a tilting of the antenna omnidirectional gain pattern" (column 5, lines 1-3).

Accordingly, Lee discloses adjusting the phases of the radiating elements to achieve tilting of the radiation pattern in the vertical direction. However, Lee does not disclose adjusting the amplitude of the radiating elements as claimed in claim 1or adjusting the phase or amplitude to "decrease attenuation in radiated power with distance from the antenna" also as claimed in claim 1.

As previously established, Blasing does not provide the missing teachings.

Claim 2 depends from claim 1 and adds the recitation of adjusting the phases and amplitudes of the radiating elements to "mitigate nulls between lobes of combined radiated signals collectively from the antenna elements". Lee does not teach this feature either (and the Office has not asserted that it does, instead continuing to erroneously rely on Blasing for this teaching).

Claim 3 depends from claim 1 and adds the recitation of adjusting the phases and amplitudes of the radiating elements "to reduce excess signal power at near range". Lee does not teach this feature either (and the Office has not asserted that it does, instead continuing to erroneously rely on Blasing for this teaching).

At best, Lee teaches one of the two phase and amplitude adjustment techniques recited in claim 1 and the Office has conceded that Blasing does not teach this technique. Accordingly, the combination of Lee and Blasing does not teach all of the limitations of claim 1. Accordingly, the obviousness rejection of claim 1 necessarily fails.

With respect to claim 2 and the limitation of mitigating nulls between lobes of combined radiated signals, the Office refers to column 22, lines 20-53 of Blasing (which is a different portion than the Office was relying on for this alleged teaching in the previous Office Actions). Column 22, lines 20 through 53 of Blasing state:

> Use of Shaped Beam or Ultra Low Sidelobe Antennas to Improve Signal to Noise in Adjacent Sectors
>
> An additional aspect which may be implemented in conjunction with the system described above is to use low sidelobe antennas as the transmitter sources at the node. This gives the advantage of reducing the sidelobe in the one over adjacent sectors where the polarization is again the same as for the transmitting antenna. There are two basic approaches. The first involves using antennas which distribute power to the individual radiating elements so that the center-most elements radiate more power than the elements at the periphery of the antenna. In this fashion, the first sidelobe exposed to the one over adjacent sector is

> substantially lower. This results in a lower level of unwanted energy in the one over adjacent sector.
>
> Shaped Beam Antenna Patterns
>
> Another feature of the invention involves the use of a shaped beam antenna. In this case, the transmit antenna emanates a shaped beam with the kind of pattern 300 shown in FIG. 41. FIG. 40 illustrates a conventional beam pattern 298 that is formed without beam shaping. As can be seen from the figure, the 3 dB roll off within the main beam is reduced to approximately 1 dB. This results in a reduced amount of power necessary to illuminate the edges of the sector with minimum power levels as compared with the conventional antenna. Either the center of a sector receives 3 dB excess power or the sector edge receives 3 dB to little power, depending on the point of reference when using a conventional antenna. For the shaped beam antennas the difference is only 1 dB, a substantial improvement. This has the advantage of reducing the power spillover into the next cell in a cellular system. See FIG. 41. The shaped beam antenna also has very good sidelobes which result in low levels of one over adjacent sector unwanted signals.

The above quoted portion of Blasing does not mention nulls between lobes, let alone mitigation of them. Rather, this section of Blasing discusses implementing low sidelobes or shaped beam antennas in adjacent sectors. However, low sidelobes is very different than minimizing nulls between lobes. In fact, a review of Figures 40 (an unshaped beam) and 41 (the shaped beam proposed in the quoted portion of Blasing) of Blasing quite clearly shows that the nulls between the lobes are actually increased, not decreased by Blasing's beam shaping.

Accordingly, claim 2 even further distinguishes over the prior art.

With respect to claim 3 and the limitation concerning reduction of excess signal power at near range, the Office asserted that Blasing discloses this feature in column 22, lines 35-50 (already reproduced above)

Once again, this section of Blasing does not appear to have anything to do with the subject matter at issue, namely, reducing excess signal power at near range. Rather, this section addresses radiation as the function of the angle of radiation. The feature claimed in claim 3 is discussed on page 6, lines 17 through page 7, line 12 and Figure 1 of the present application. This feature is demonstrated in Figure 1 most notably by the difference between trace 6 (prior art) and trace 7 (invention) in the zero to 1000 meter portion of the graph. The above cited section of Blasing simply has nothing to do with near range gain.

Accordingly, claim 3 even further distinguishes over the prior art of record.

Conclusion

In view of the foregoing remarks, this application is now in condition for allowance. The Examiner is invited to contact Applicant's undersigned counsel by telephone call in order to further the prosecution of this case in any way.

Respectfully submitted,

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